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United Airlines Invests $30M in Fulcrum BioEnergy; Inks $1.5B+ in Aviation Biofuels Contracts

June 30, 2015 | Jim Lane

Historic aviation biofuels agreement for direct airline investment, and more than $1.5 billion in offtake options. What's it all about?

In California, United Airlines announced a $30 million direct investment in advanced biofuels developer Fulcrum BioEnergy, obtained an option to invest in five future commercial-scale aviation biofuels plants, and signed offtake agreements for up 90 million gallons of biofuels per year.

The offtake contracts are worth an estimated $1.58 billion over the 10-year offtake span, based on the current jet fuel price of $1.76 per gallon, according to Digest calculations.

The shift in United's fuel purchasing represents 3% of its annual fuel consumption, reported by the airline at 3.2 billion gallons in 2013, and comes after Cathay Pacific invested in Fulcrum BioEnergy in 2014 and signed offtake agreements from the company's first commercial facility, now under development near Reno, Nevada.

The five new plants are expected to range in size between 30 and 60 million gallons.

US Renewables Group, Waste Management and Rustic Canyon, among others, have also previously invested in Fulcrum BioEnergy, which converts municipal solid waste diverted away from landfills into diesel and jet fuel. Fulcrum's first commercial facility is expected to open before the end of 2017.

The Offtake Structure

The offtake contract is similar to the Cathay deal — 10 years. The price is indexed to the fossil fuel price — and, because of Fulcrum's fixed feedstock costs, which allow it to achieve a $1.00 per gallon (or lower)

cost at scale, the Fulcrum BioEnergy contracts are expected to play a role in United's fuel price hedging program, against future volatility in fossil fuel prices.

In addition to United, Cathay Pacific or other airlines would be expected to receive "a chunk of the offtake" for the five plants United is investing in.

The Fulcrum price is "very cost-competitive, today, even with low oil prices," Fulcrum CEO Jim Macias told The Digest. The company expects to capture RINs, the carbon credit within the Renewable Fuel Standard, but these are not part of the baseline financial equation.

United's individual plant investment is not expected to represent a majority stake in any given project, but "could be very material," Macias said. In the long-term, Fulcrum plants would be expected to have a 70/30 debt/equity ratio. While the company has not disclosed specific capital costs for its future projects, it notes "an opportunity to achieve standard economies of scale in capital expanse with larger plants, but even more opportunities in operating expense; the company noted that with no feedstock cost, the variable operating cost is primarily labor, which doesn't expand significantly in the case of operating larger plants.

The Timelines

Expect a five-plant United construction program to unfold, under normal business conditions, between now and 2022, or seven years away.

The Significance

This is a big event for us, and we think for the industry," Macias told The Digest. "We are seeing more and more that United is going to be a prime mover and that strategic players are stepping up to help this sector come to life. Cathay did, and this deal is significantly bigger. Having companies come in with a very significant commitment to participate is good news all around. For us, it tightens up our schedule and gives us greater certainty that these plants will be built on schedule and on time.

"We have created a business that will compete directly with fossil fuel on the basis of cost and sustainability. Since our inception, Fulcrum has developed a robust operating platform and business plan that brings in large industry leaders to create value throughout the waste to fuels process. We have combined the best team in biofuels with two of the largest waste service companies, two major airlines, the U.S. Air Force, the U.S. Navy, the USDA, the best technology providers and a premier contractor to build out our program," Macias added.

The Fulcrum fuels

The fuel produced at Fulcrum's plants will reduce greenhouse gas emissions by more than 80% compared to traditional petroleum fuel helping companies achieve sustainability goals without increasing costs. With a true zero-cost MSW feedstock supply, Fulcrum BioEnergy will produce a new source of refined oil products at a lower cost than the same petroleum products and with positive sustainability attributes.

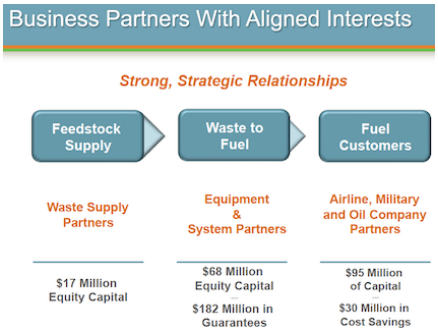
Municipal Solid Waste as Raw Material

Previously, Fulcrum has partnered and entered into agreements with two of the nation's largest waste services companies, Waste Management and Waste Connections, to secure large volumes of municipal solid waste under long-term contracts. As a result, Fulcrum said it has established a stable feedstock supply that provides a significant competitive advantage relative to traditional fossil fuels.

US Defense Department Invests in the Technology; the USDA Loan Guarantee

The Fulcrum Sierra BioFuels project was awarded a $70 million grant from the U.S. Department of Defense to fund a portion of the construction of the Sierra BioFuels Plant. And it has executed a

conditional commitment with the U.S. Department of Agriculture for a $105 million loan guarantee of project debt for the Sierra BioFuels Plant, and is working through project due diligence with its lender of record, Bank of America.



The Technology

Gasification System

Fulcrum BioEnergy has licensed a highly efficient and economic gasification system from ThermoChem Recovery International for the conversion of the prepared MSW feedstock to syngas. During the gasification process, the MSW feedstock rapidly heats up upon entry into the steam-reforming reactor and almost immediately converts to syngas. The syngas is then cleaned to safely remove any contaminants before being converted to liquid fuels.

Fischer-Tropsch Process

The company will utilize a conventional Fischer-Tropsch process that has been commercially operational at projects around the world for several decades. In the FT process, the clean syngas is processed through a fixed-bed tubular reactor where it reacts with a proprietary catalyst to form FT syncrude. The FT syncrude can then be upgraded to jet fuel and diesel that can be sold directly into the existing transportation market with no engine modifications.

The Technology's Demonstration

In 2014, Fulcrum successfully completed integrated demonstration testing, at scale, of its waste to fuels process. Fuel produced from the demonstration plant meets ASTM requirements for use as commercial or military jet and diesel fuels. Fulcrum's technology success has been reviewed and confirmed by numerous third parties including independent engineers, the U.S. Department of Agriculture and the U.S. Department of Defense.

Fuel Cost and Competitiveness

With MSW as its feedstock, Fulcrum can produce the fuel at a cost of less than $1.00 per gallon, which makes it very cost competitive with petroleum fuel. Fulcrum's fuel reduces greenhouse gas emissions by more than 80% compared to fossil fuel.

The First Commercial Plant

The Sierra BioFuels Plant is Fulcrum's first commercial-scale plant. Located approximately 20 miles east of Reno, NV, the Sierra plant will convert more than 180,000 tons of prepared MSW feedstock into approximately 12 million gallons per year of renewable syncrude that will be further refined into low-carbon transportation fuel. Permitting, front-end engineering and site preparation activities for the Sierra plant have been completed and construction activities will begin this fall with production beginning in 2017.

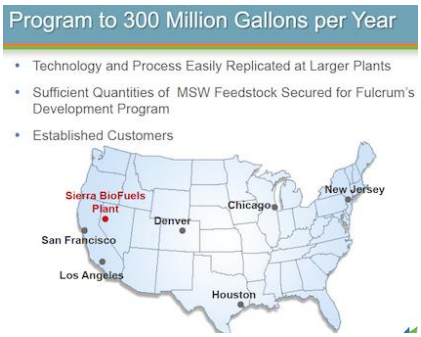
Engineering, Procurement and Construction

Earlier this year, Fulcrum selected Abengoa as the primary contractor for engineering, procurement and construction, which uses gasification technology to convert municipal solid waste into syncrude that is be upgraded into jet fuel. The contract is worth approximately $200 million, and is expected to generate more than 500 jobs during the construction phase and 100 more jobs during plant operation. The biorefinery is located in the Tahoe-Reno Industrial Center, approximately 20 miles east of Reno, Nevada. The Sierra BioFuels Plant will have production of more than 10 million gallons of renewable transportation fuel.

At the heart of the agreement is a striking set of guarantees from Abengoa on cost, schedule and performance — especially since the core processes include separate waste-gasification technology licensed by Fulcrum in a partnership with ThermoChem Recovery, and a Fischer-Tropsch technology for conversion of syngas to diesel and jet fuel, licensed by Fulcrum in partnership with Emerging Fuels Technology.

Expansion: Up to 300 Million Gallons Per Year

The Sierra Plant's modular design can be replicated and scaled to efficiently build larger facilities that will produce between 30 and 60 million gallons of jet or diesel fuel annually. With long-term MSW feedstock contracts with Waste Management and Waste Connections, and fuel offtake agreements with United and Cathay Pacific, Fulcrum is accelerating development activities for additional, larger scale projects across North America that can produce more than 300 million gallons of low-carbon, renewable transportation fuels annually.



The Cathay Pacific Relationship

Last August, Cathay Pacific Airways announced that it is the first airline investor in Fulcrum BioEnergy as part of the airline's biofuel strategy and to help it achieve a target of carbon-neutral growth from 2020. Cathay Pacific, which also has an option for further investment, has also negotiated a long-term supply agreement with Fulcrum for an initial 375 million US gallons of sustainable aviation fuel over 10 years (representing on an annual basis approximately 2% of the airline's current fuel consumption) that meets all the airline's technical requirements and specifications.

More on Fulcrum BioEnergy

Our 5-Minute Guide to Fulcrum Bioenergy is here.